EVALUATION OF DIFFERENT ANTIASTHMATIC DRUGS EFFECTS ON

PULMONARY FUNCTION IN ADULT PATIENTS WITHCHRONIC

ASTHMA IN BASRA GOVERNORATE

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ABSTRACT

Asthma is a common disease that affect the population worldwide It is characterized by chronic inflammation of the airways induced by many trigger factors and causes The use of different antisthmatic drugs give variable results on disease control and prevention of serious prognosis events in addition to decreasing severity of disease Combination of antiasthmatic drugs have the advantage of best disease control but it have the problem of side effects profile The aim is to study and compare the effects of different antiasthmatic drugs on pulmonary function of asthma patients and disease control in Basra governorate south of iraq A total of 190 subjects were recruited in this study, 30 subjects were healthy and 160 were asthmatic patients divided into four groups: 40 patients with no treatment, 40 patients treated with inhaled bronchodilators, 40 patients treated with inhaled beta 2 agonist LABA plus corticosteroids (mainly salmetrol and fluticasone combination) and 40 patients treated with oral episodic use of steroids and or montelukast (prednisolone and singulair) Pulmonary function tests (FEV1, FEV3, FVC, FEF 25-75%, and PEFR) were done for all groups Data were represented as mean ±standard error of the mean (SE) the data were analyzed by Microsoft excel 2007 using ANOVA two way and T- test analysis program to compare the results The results revealed that group 3 asthmatic patients (treated with inhaled beta 2 agonist LABA plus corticosteroids) were the best in pulmonary function tests, followed by group 2 (patients treated with inhaled bronchodilators), and the lowest were group 1 and 4 The results also showed that not only pulmonary function tests different between groups but also the asthma severity were different Combination of antiasthmatic drugs (inhaled LABA & ICs) improves pulmonary function tests and decreases asthma severity greater than other antiasthmatic treatment modalities

KEYWORDS: Asthma, Antiasthmatics, Pulmonary Function Test

INTRODUCTION

Asthma can be defined according to the "National Institutes of Health" (NIH) Expert Panel Report 3 (EPR-3): Guidelines for the Diagnosis and Management of Asthma, as a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role, in particular, mast cells, eosinophils, T lymphocytes, neutrophils, and epithelial cells [1] This inflammatory process can cause recurrent episodes of wheezing, breathlessness, chest tightness, and cough in susceptible persons, especially at night and in the early morning so that these episodes are usually associated with widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment [2] Asthma is widely variable in presentation and it ranges from chronic daily symptoms to only intermittent symptoms with the intervals between symptoms of days, weeks, months, or years [3] Spirometry can be indicated as a part of the initial diagnostic

evaluation for asthma in all patients 5 years old to test for airflow obstruction, the severity, and the short-term reversibility [4] The definitive advantage of the inhaled corticosteroids (ICSs) in asthma is their high topical anti-inflammatory potency in the lung and low systemic activity [5] The two LABAs, formoterol and salmeterol, provide long-lasting bronchodilation (12 or more hours) when administered as aerosols [6] Long acting beta 2 agonists (LABA) addition will allow reduction in ICS dosage by 50% in most patients with persistent asthma [7] Pulmonary function tests include Forced vital capacity (FVC) which is the maximum volume of air that can be exhaled or inspired during a maximally forced maneuver, FEV1 (forced expired volume in one second) which is the volume expired in the first second of maximal expiration after a maximal inspiration and is a useful measure of how quickly full lungs can be emptied, FEV3 (forced expired volume in three seconds), FEF 25-75% which is the average expired flow over the middle half of the FVC maneuver and is regarded as a more sensitive measure of small airways narrowing than FEV1, PEF (peak expiratory flow) is the maximal expiratory flow rate achieved and this occurs very early in the forced expiratory manoeuvre and FVC6 which is the forced expiratory volume during the first 6 seconds and is a surrogate of the FVC This study aimed at studying the effects of different antiasthmatic drugs on pulmonary function tests of patients with chronic asthma in Basra south of Iraq

SUBJECTS AND METHODS

This study was carried out at Asthma and Allergy Center in Basra and the diagnosis of the disease was confirmed by specialist physicians in internal medicine

A total of 190 subjects were recruited in this study, 30 subjects were healthy and 160 were asthmatic patients divided into four groups: group 1 includes 40 patients with no treatment, group 2 includes 40 patients treated with inhaled bronchodilators, group 3 includes 40 patients treated with inhaled beta 2 agonist LABA plus corticosteroids (mainly salmetrol and fluticasone combination) and group 4 includes 40 patients treated with oral episodic use of steroids and or montelukast (prednisolone and singulair) Pulmonary function tests (FEV1, FEV3, FVC, FEF 25-75%, and PEFR) were done for all groups The recruited subjects were **107 females** and **83 males**; they are demographically aliened in about the same ratios between the groups, as illustrated in **table 1**

Asthmatic groups of patients were different in severity of asthma from mild, intermittent to sever persistent Also, they are aliened in about the same ratios between the groups, as illustrated in **table 2 and figures 6 and 7** Data were represented as mean ± standard error of the mean (SE) The data were analyzed by Microsoft excel 2007 using ANOVA one way analysis program Values considered significant if the P values less than 005 Patient history and physical findings were taken for all subjects

RESULTS AND DISCUSSIONS

The results in this study showed that there was a significant difference in FEV1 results between study groups at p<005 **figure 1** All study groups showed decline in FEV1 as compared to normal group of subjects Results in group 3 patients were significantly different from that of groups 1 & 4 Results in group 4 patients showed significant difference from that of groups 1 & 3

In **figure 2**, the results showed that there was a significant difference in FEV3 values at p<005 between all study groups of patients and that of normal group of subjects Group 3 patients showed a significant change in FEV3 values from that of groups 1& 4 Results of group 4 showed a significant difference from that of groups 1 & 3 Results of FVC in **figure 3** showed a significant change between all study groups and that of normal group of subjects Results of group 3 patients

showed a significant difference from that of groups 1 & 4 Results of group 4 showed a significant difference from that of groups 1 & 3 Results of group 2 patients showed a significant change from that of group 1

In **figure 4 & 5**, results showed a significant difference at $p<005$ between all study groups of patients and that of normal group of subjects in FEF 25-75 & PEFR values Group 3 patients showed a significant change from that of groups 1 & 4 Results of group 4 showed a significant difference from that of groups 1 & 3 Results of group 2 patients showed a significant change from that of group 1 Results in **table 2** and in **figure 6 & 7** showed that all study groups of patients were different in severity of asthma from mild intermittent to sever persistent more patients in group 3 showed the lowest level of severity (less frequency of the severe persistent asthma) and the highest frequency of mild intermittent form The highly frequent sever persistent asthma was in groups 1 & 4 The results in this study showed that patients who used combination of inhaled long acting beta 2 agonists (LABA) and inhaled corticosteroids (ICs) get best values in FEV1, FEV3 & FVC as compared to that of patients who used inhaled beta 2 agonists alone and those used oral steroids and / or montelukast Also those patients showed a significant improvement in these pulmonary function tests as compared to those patients that are not on routine treatment who were categorized as newly diagnosed asthmatic patients Patients who used combination of inhaled LABA + ICs also showed improvement in FEF25 – 75 and PEFR values as compared to that of newly diagnosed group of patients and those who used inhaled beta 2 agonists bronchodilators in addition to those on oral corticosteroids and / or montelukast Severity of asthma was less in those patients who used combination therapy as compared to other groups of patients This can be attributed to the type of treatment and its scucessfulness Long-term therapy for persistent asthma improves and suppresses inflammation in addition to decreasing recurrent exacerbations [8] Comparing leukotriene receptor antagonists (LTRAs) to inhaled corticosteroids, ICs are the preferred treatment option for mild persistent asthma in adults and children LTRAs are an alternative, although not preferred therapy [9] Because of their potency and consistent effectiveness, ICs are considered the preferred long-term control therapy for persistent asthma in all patients [10] Combination therapy can be considered as more effective than higher-dose ICS alone in reducing asthma exacerbations in patients with persistent asthma [7]

CONCLUSIONS REMARKS

From the results above, we conclude that patients using combination modality of antiasthmatic treatment had a good improvement in pulmonary function tests more than that of those who used other treatments and also the severity of asthma showed a great decline in this group of patients where as those newly diagnosed and those on inhaled bronchodilators and those on oral steroid and / or montelukast therapy showed decline in pulmonary function tests and much more severity of the disease

ACKNOWLEDGEMENTS

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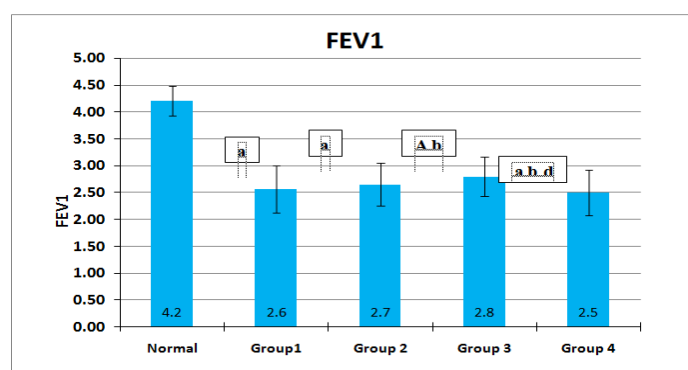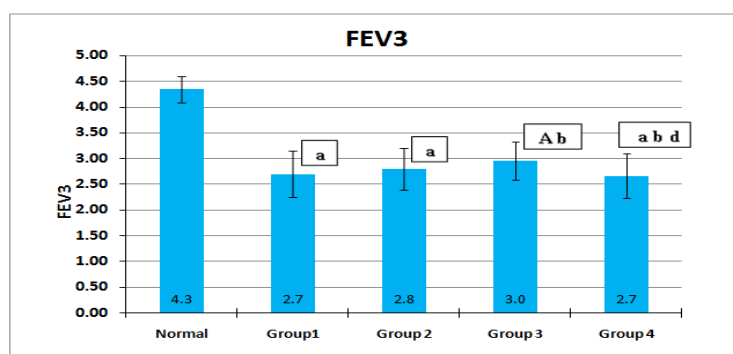
APPENDICES

Figure 1: Histogram Showing Values of FEV1 (L) in Patients with Chronic Asthma Treated with Different Antiasthmatic Drug Therapy

Values expressed as mean $\pm$ standard error of mean

a Significantly different ($p < 005$) as compared with normal group values

b: Significantly different ($p < 005$) as compared with group 1 values

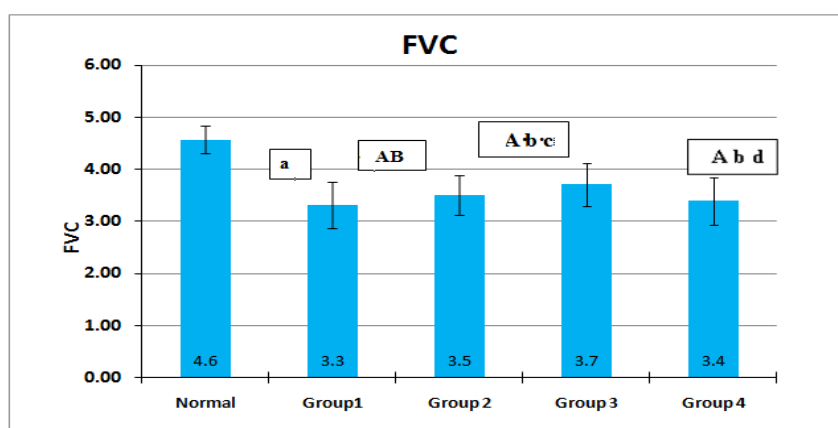D: Significantly different ($p < 005$) as compared with group 3 values

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**Figure 2: Histogram Showing Values of FEV3 (L) in Patients with Chronic
Asthma Treated with Different Antiasthmatic Drug Therapy**

Values expressed as mean $\pm$ standard error of mean

a Significantly different (p<005) as compared with normal group values

b: Significantly different (p<005) as compared with group 1 values

D: Significantly different (p<005) as compared with group 3 values

**Figure 3: Histogram Showing Values of FVC (L) in Patients with Chronic
Asthma Treated with Different Antiasthmatic Drug Therapy**

Values expressed as mean $\pm$ standard error of mean

a Significantly different (p<005) as compared with normal group values

b: Significantly different (p<005) as compared with group 1 values

C: Significantly different (p<005) as compared with group 2 values

D: Significantly different (p<005) as compared with group 3 values
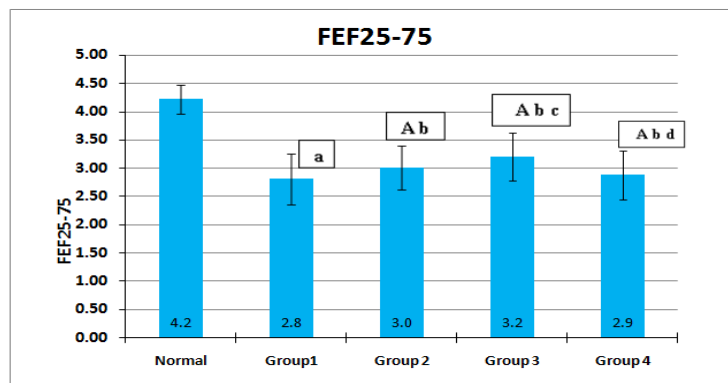
FEF25-75

Figure 4: Histogram Showing Values of FEF25-75 (L) in Patients with Chronic Asthma Treated with Different Antiasthmatic Drug Therapy

Values expressed as mean $\pm$ standard error of mean

a Significantly different (p<005) as compared with normal group values

b: Significantly different (p<005) as compared with group 1 values

C: Significantly different (p<005) as compared with group 2 values

D: Significantly different (p<005) as compared with group 3 values
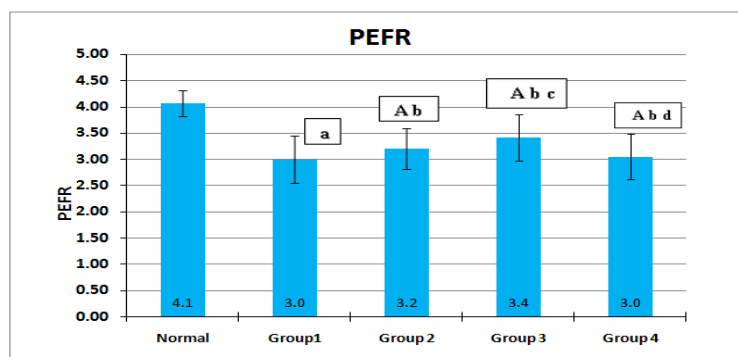
PEFR

Figure 5: Histogram Showing Values of PEFR (L) In Patients with Chronic Asthma Treated WITH Different Antiasthmatic Drug Therapy

Values expressed as mean $\pm$ standard error of mean

a Significantly different (p<005) as compared with normal group values

b: Significantly different (p<005) as compared with group 1 values

C: Significantly different (p<005) as compared with group 2 values

D: Significantly different (p<005) as compared with group 3 values

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Table 1: Demographic Distribution of Study Subjects

	Study Groups	Normal	Group 1	Group 2	Group 3	Group 4
Number of patients	**Male**	13	18	17	16	19
	Female	17	22	23	24	21
	Total	30	40	40	40	40

Table 2: Level of Severity of Asthma in Study Patients

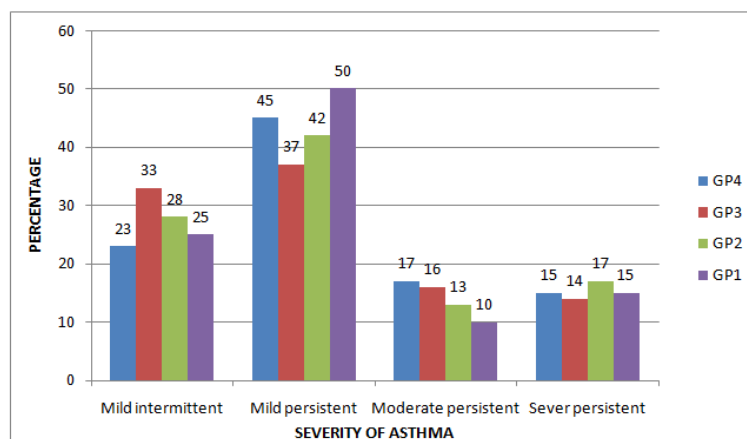| Study Groups Severity of Asthma	Group 1	Group 2	Group 3	Group 4
Mild intermittent	25	28	33	23
Mild persistent	50	42	37	45
Moderate persistent	10	13	16	17
Sever persistent	15	17	14	15

**Figure 6: Histogram Showing the Relationship between the Percentage
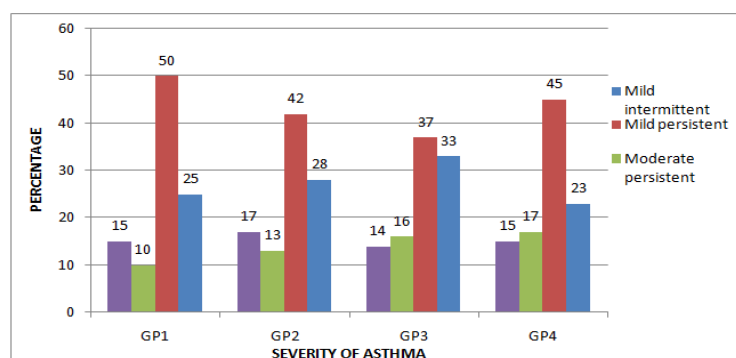and Severity of Asthma in Patient Groups**

**Figure 7: Histogram Showing the Relationship between the Percentage
and Severity of Asthma in Patient Groups**